EMERGENCY ACTION PLAN

BOX ELDER CREEK DAM
(BOLSTER)

City of Plentywood
PO Box 1
Plentywood, Montana 59254

August 1, 1998

Revised: September 9, 2002
9 December, 2004
4/12/06
4/9/07

If Box Elder Creek Dam (Bolster Dam) is failing or failure seems imminent, call:

Sheridan County Sheriff.....765-1200 or 911

Disaster & Emergency Services.....765-2970

City of Plentywood, Alvin Hollatz.....Office: 765-1700
.....Home: 765-2087

TABLE OF CONTENTS

I. INTRODUCTION

A. Purpose

The purpose of this emergency action plan (EAP) is primarily to safeguard lives and secondarily to reduce property damage to the citizens of Sheridan County living near Box Elder Creek, and along Big Muddy River in the event of flooding caused by a failure of Box Elder Creek Dam (Bolster Dam).

B. Description of Dam

Box Elder Creek Dam (Bolster Dam) is in Sheridan County, in Section 17, Township 35 North (T35N), Range 55 East (R55E), and located on Box Elder Creek, a tributary of Big Muddy River. It is owned by the City of Plentywood, and is used primarily for flood control, with incidental storage for recreation and irrigation. Technical data pertaining to Box Elder Creek Dam (Bolster Dam) is listed in Appendix A.

C. Access to Dam

Box Elder Creek Dam (Bolster Dam) is located immediately north of the city of Plentywood Montana. As shown on the inundation maps in Appendix B, two dirt roads access the Box Elder Creek Dam (Bolster Dam) from the city of Plentywood. Note that the east road may become flooded!

D. Hazard Area

The evacuation area extends along Box Elder Creek and the Big Muddy River to a point about ten miles downstream of where Big Muddy River passes through the town of Reserve as shown in Appendix B. Hazards include the possible inundation of many occupied dwellings, state Highway 16, and county road 258 as shown on the inundation and evacuation maps are in Appendix B.

E. Responsibility and Authority

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation was defined through coordination of this plan with the County Sheriff and Disaster and Emergency Services (DES) coordinator.

F. Periodic Review/Update

The owner shall review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.

G. Approval

By my signature, I acknowledge that I, or my representative, have reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

Terry Gilbertson Signature Date 8-19-02.
MAYOR, CITY OF PLENTYWOOD

Mike Oswald Signature Date 7-3-02
SHERIDAN COUNTY SHERIFF'S DEPARTMENT

Curtis Petrik Signature Date 8-21-02
SHERIDAN COUNTY DISASTER AND EMERGENCY SERVICES

II. NOTIFICATION PROCEDURES

A. Imminent or Actual Failure

If BOX ELDER (BOLSTER DAM) IS FAILING, TWO THINGS MUST BE DONE IMMEDIATELY:

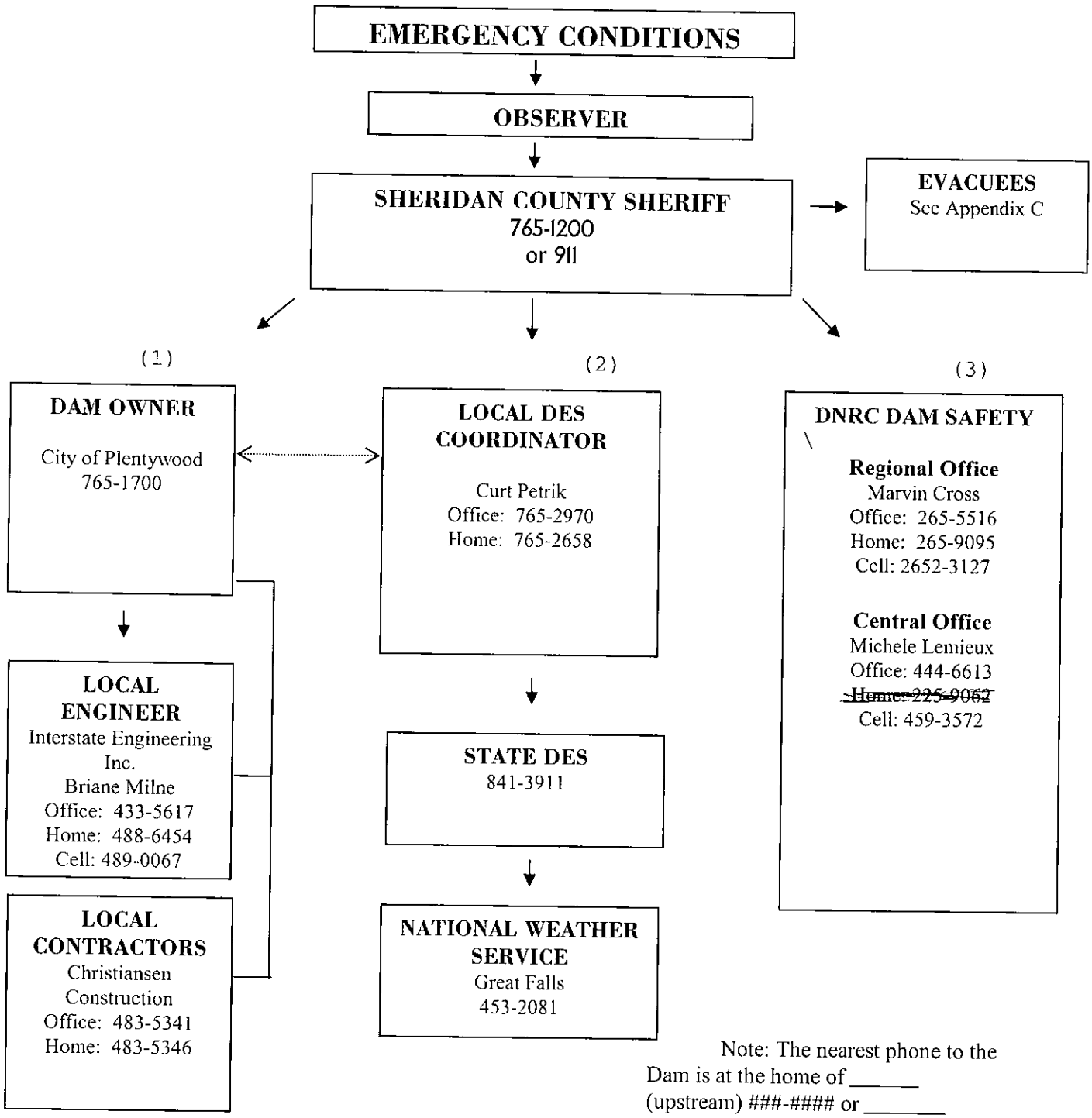
(1) Residents in the hazard area downstream from the dam must be warned according to the county warning plan, and initiated as shown in Figure 1, and

(2) Any steps that might save the dam or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dam fails).

As dam owner, it is your responsibility to:

1. Call the Sheriff's Dispatch Center (406) 765-1200 or (911) and Disaster and Emergency Services (765-2970), if they have not already been notified. Be sure to say, "This is an emergency". They will call other authorities and the media and begin the warning plan.
2. Warn anyone in immediate danger to evacuate to safety. This includes someone on the dam, directly below the dam, or boating on the reservoir, or downstream evacuees, if so directed by the sheriff.
3. Contact the Disaster and Emergency Services staff at least once every hour. They may request your assistance in evacuating residents.
4. If all means of communication are lost:
   a. Try to find out why
   b. Get someone else to try to reestablish communications. If these means fail, take care of immediate problems and send someone to get to another radio or telephone that works.

FIGURE 1
BOX ELDER (BOLSTER) DAM
ACTUAL OR IMMINENT FAILURE
"NOTIFICATION FLOW CHART"

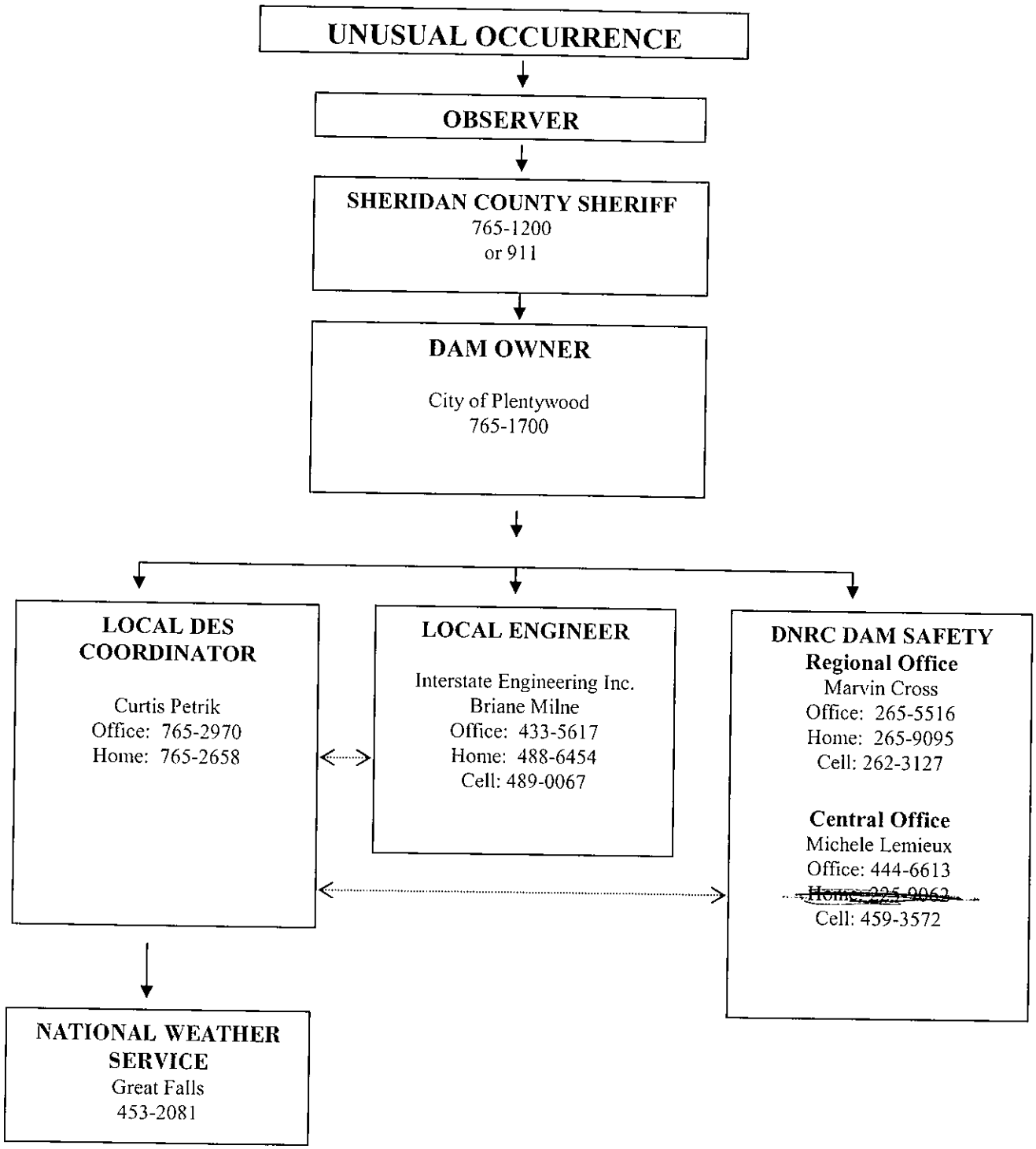


Note: The nearest phone to the Dam is at the home of _____ (upstream) ###-#### or _____ (downstream) ###-####.

B. Potentially Hazardous Situation

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems (see section B.2.), failure of the spillway or outlet works, heavy precipitation or rapid spring snow melt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2.

FIGURE 2
BOX ELDER (BOLSTER) DAM
UNUSUAL OCCURENCE
"NOTIFICATION FLOW CHART"



1. If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:

   a. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.
   b. Notify the county Disaster and Emergency Services Coordinator (765-2970) of the potential problem.
   c. Contact the Dam Safety Program (~~444-6664 or~~ 6613) of the Department of Natural Resources and Conservation (DNRC).

2. Among the conditions the dam owner should watch for are:
   a. Overtopping of the dam by floodwaters
   b. Loss of material from the dam crest due to storm wave erosion
   c. Slides on either the upstream or downstream slope of the embankment as evidenced by
      1. Sloughing
      2. Cracking
      3. Bulging
      4. Scarping
   d. Erosional flows through, beneath, or around the embankment as evidenced by
      1. Excessive seepage
      2. Discoloration of the seepage
      3. Boils on the downstream side
      4. Sinkholes
      5. Changes in the flow from drains
   e. Failure of outlets or spillways due to clogging or erosion
   f. Movement of the dam on its foundation as evidenced by
      1. Misalignment
      2. Settlement
      3. Cracking

3. Before calling either an engineer or DNRC to report a problem, the dam owner shall use the form in Appendix D to ensure sufficient information is provided for the engineer to analyze the problems. After talking to the engineer, it may be helpful to document the condition of the dam by making a sketch on the form in Appendix D, showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take mitigate the effect of many problems.

C. <u>Posting of the Notification Flowchart and Distribution of the EAP.</u>
The Notification Flow Charts and (EAP) are posted at City Hall, and at Central Dispatch. The EAP is distributed to the offices of the Sheridan County Sheriff and Disaster and Emergency Services Coordinator as shown in Appendix E.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Program (444-6613 or 6664). Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems:

A. Potential Problems and Immediate Response Actions

1. OVERTOPPING BY FLOOD WATERS
   - a. Open outlet to its maximum safe capacity.
   - b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.
   - c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
   - d. Divert flood waters around the reservoir basin, if possible.
   - e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.

2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION
   - a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.
   - b. Lower the water level to an elevation below the damaged area.

3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT
   - a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
   - b. Stabilize slides on the downstream slope by
     1. weighting the toe area with additional soil, rock, or gravel, and then
     2. restoring lost freeboard by placing sandbags at the crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS
   a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).
   b. Lower the water level until the flow decreases to a non-erosive velocity or stops.
   c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.

5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS
   a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.
   b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)
   a. Immediately lower the water level until excessive movement stops.

7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT
   a. Lower the water to a safe level.
   b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION
   a. Reduce the flow over the spillway by fully opening the main outlet.
   b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.
   c. When the inflow subsides, lower the water to a safe level.

9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT
   a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.
   b. If necessary, restore freeboard, preferably by placing sandbags.

B. Emergency Supplies and Resources

A supply of sand, gravel and soil is available at the city shops, approximately 2 miles south of the dam. Call City Dispatch at 765-1700 to have the shops crew paged.

C. Local Contractors and Engineers

Local Contractors:

Christiansen Construction
Antelope, MT 59211
Work: 483-5341
Home: 483-5346

Engineer:

Interstate Engineering, Inc.
Briane Milne
Box 648
Sidney, MT 59270
Work: 433-5617
Home: 488-6454
Cell 489-0067

APPENDICES

APPENDIX A

Technical Data For Box Elder Creek Dam (Bolster Dam)

Max Reservoir Capacity to the Crest of the Dam: .....6,378 acre feet

Normal Reservoir Capacity Measured to the Principal Spillway Crest: .....1,252 acre feet

Normal Water Depth Measured from the Streambed to the Crest of the Emergency Spillway33.5 feet

Dam Height Measured From Streambed to Crest of the Dam: ....63 feet

Dam Crest Width: ..... 18 feet

Length of Dam Crest:.....1,754 feet

Principal Spillway / Outlet Capacity: ..... 145 cubic feet per second

Emergency Spillway Capacity, West ..... 23,000 cubic feet per second

Emergency Spillway Capacity, East..... 8,000 cubic feet per second

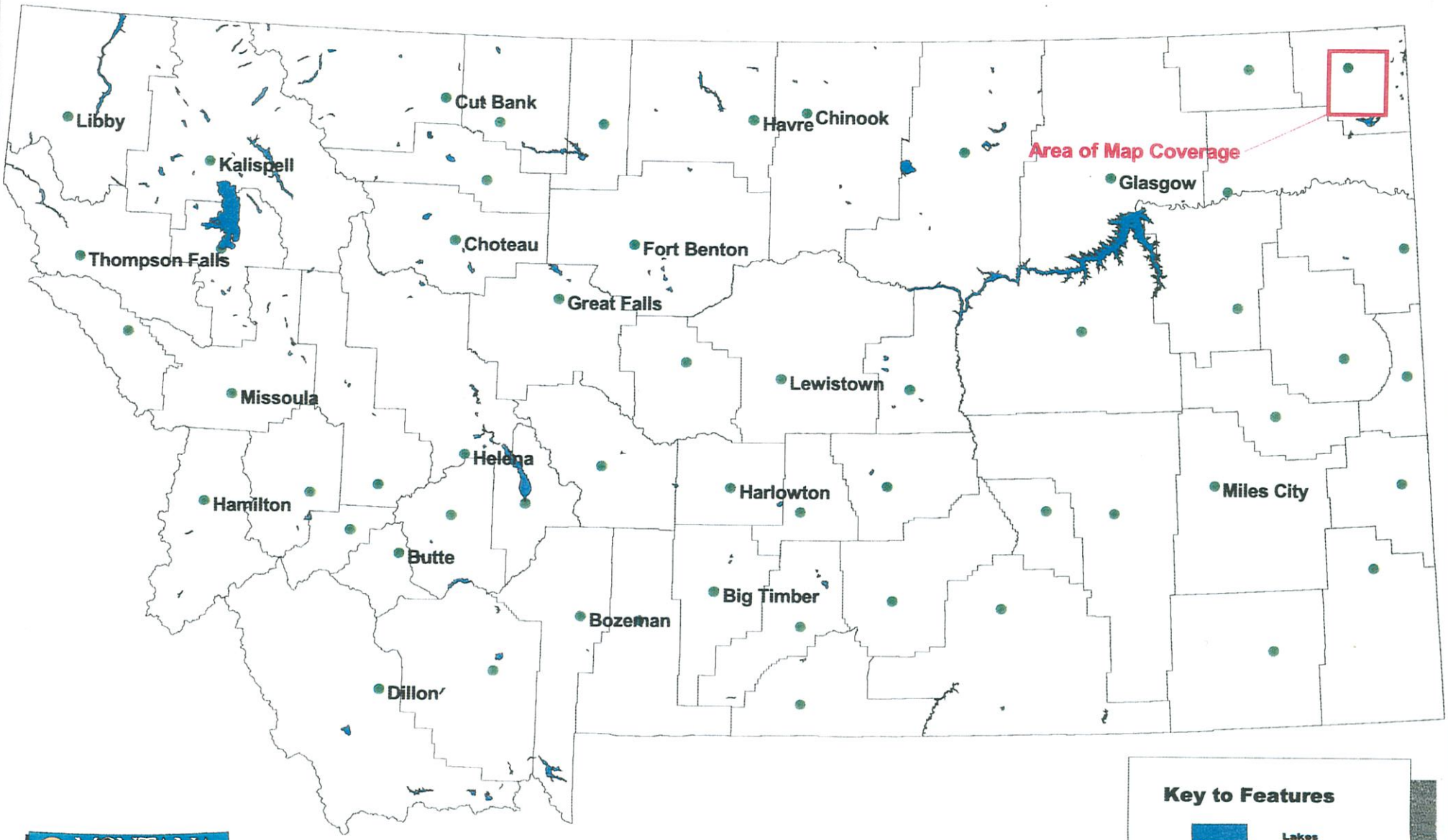
Date Constructed..... 1963

Slope of Upstream Face of Dam (Horizontal to Vertical).....3:1 (upper)

Slope of Downstream Face of Dam (Horizontal to Vertical).....2.5:1 (lower)

APPENDIX B Inundation & Evacuation Maps

Boxelder Dam Overview Map



MONTANA DNRC

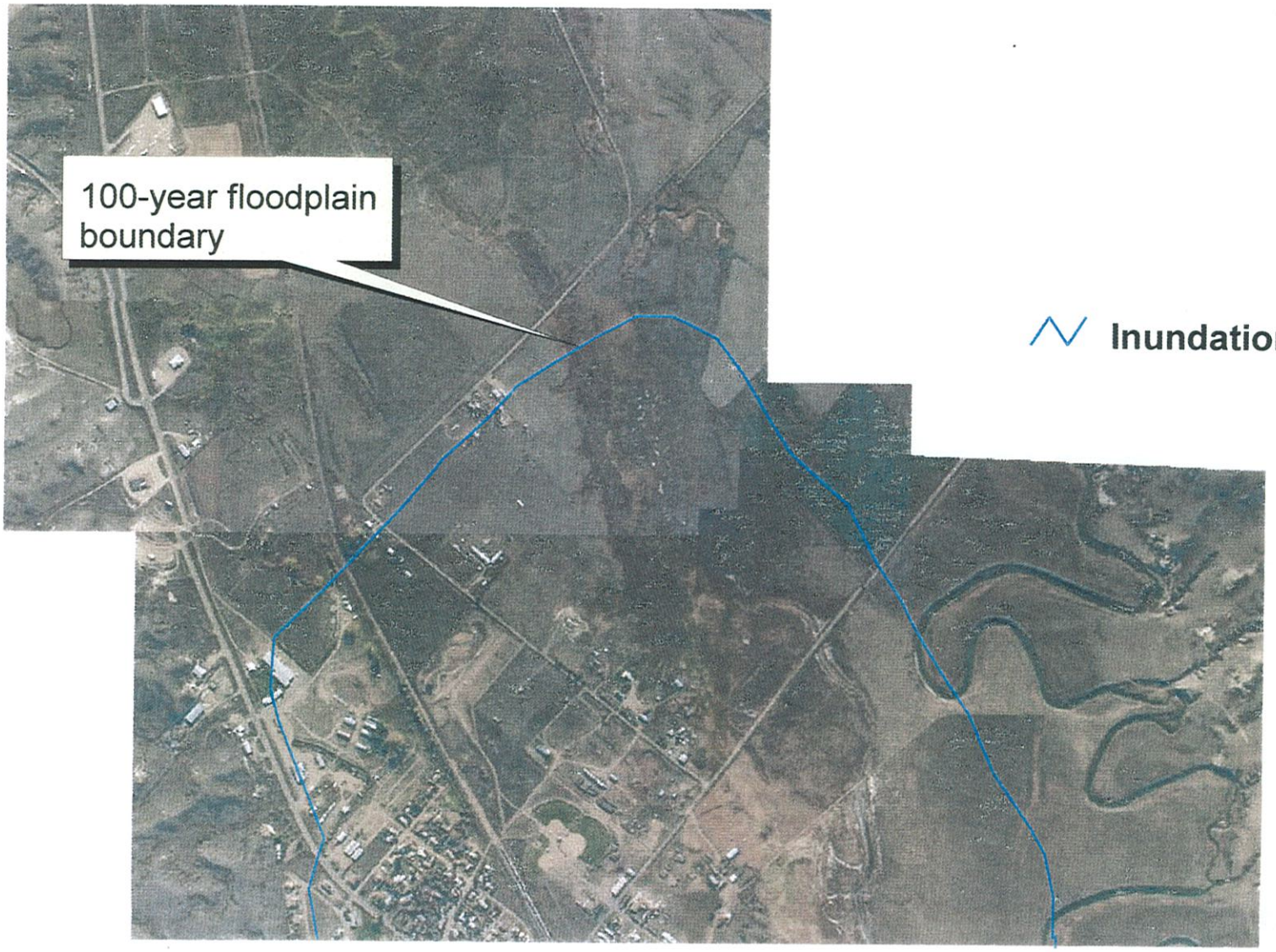
Kevin Premore (October 2001)

N

Inundation / Evacuation Area

Box Elder Creek Dam Evacuation Photos

Box Elder Creek Dam
Evacuation Photos



Inundation / Evacuation Area

N

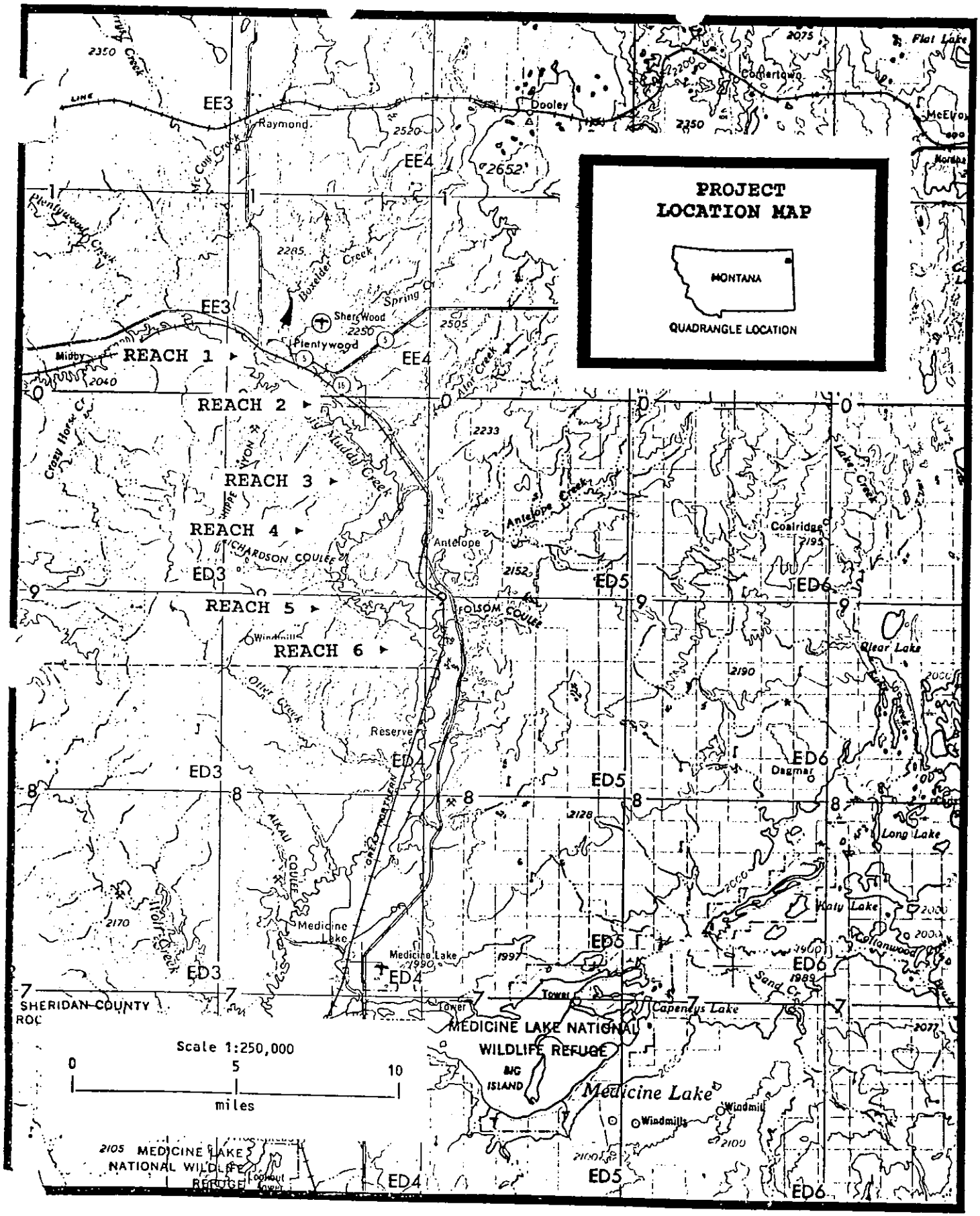
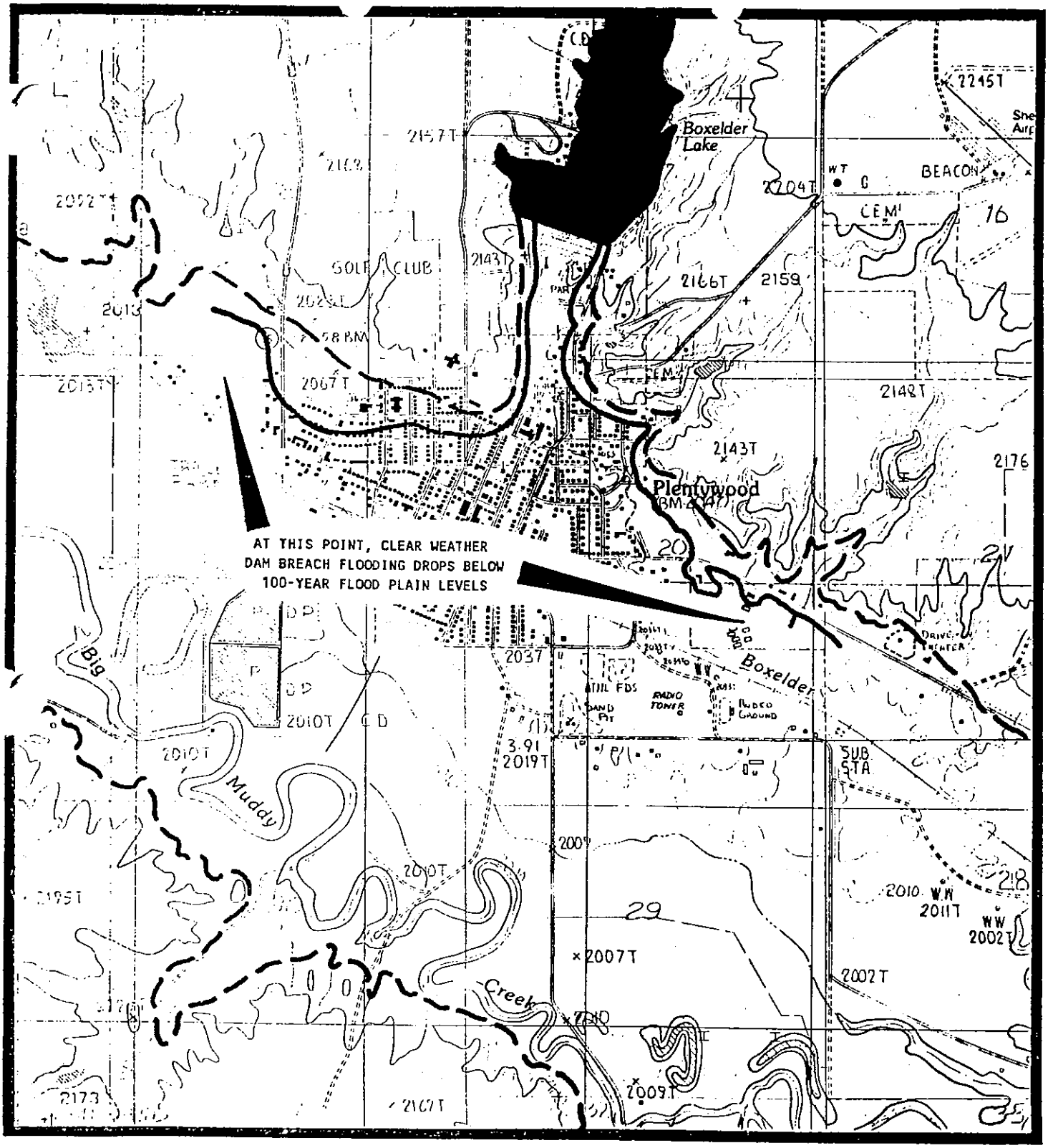

PROJECT LOCATION MAP
MONTANA
QUADRANGLE LOCATION
REACH 1
REACH 2
REACH 3
REACH 4
REACH 5
REACH 6
EE3
EE4
ED3
ED4
ED5
ED6
Raymond
Dooley
Flat Lake
Collertown
McElroy
Sheridan
Plentywood
Midby
Antelope
Coalridge
Reserve
Dagmar
Clear Lake
Long Lake
Katy Lake
Medicine Lake
Medicine Lake NATIONAL WILDLIFE REFUGE
Windmills
Tower
Capeulus Lake
SHERIDAN COUNTY
Scale 1:250,000
0
5
10
miles
2105 MEDICINE LAKE NATIONAL WILDLIFE REFUGE

FIGURE 1



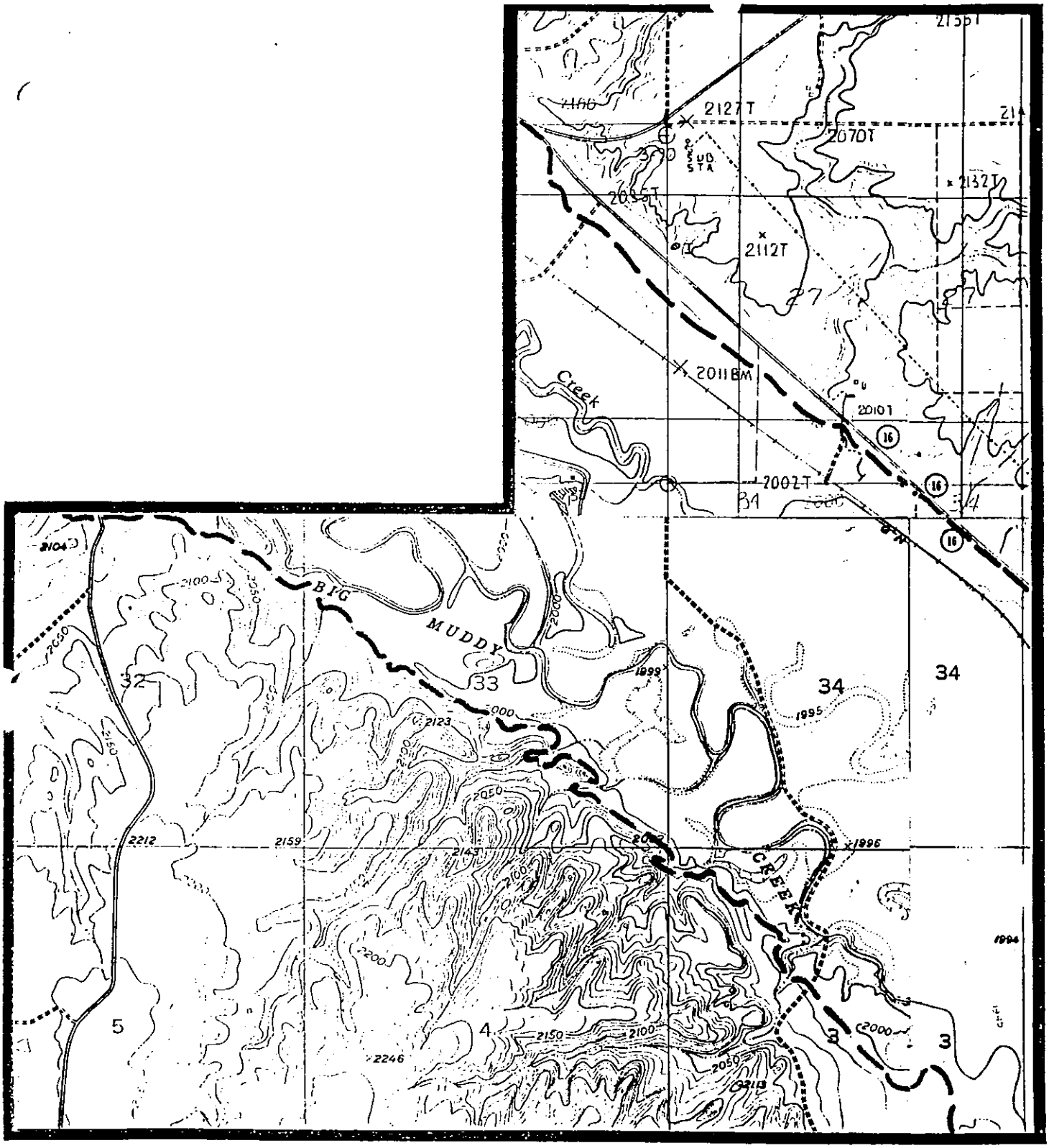
MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 1

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 2



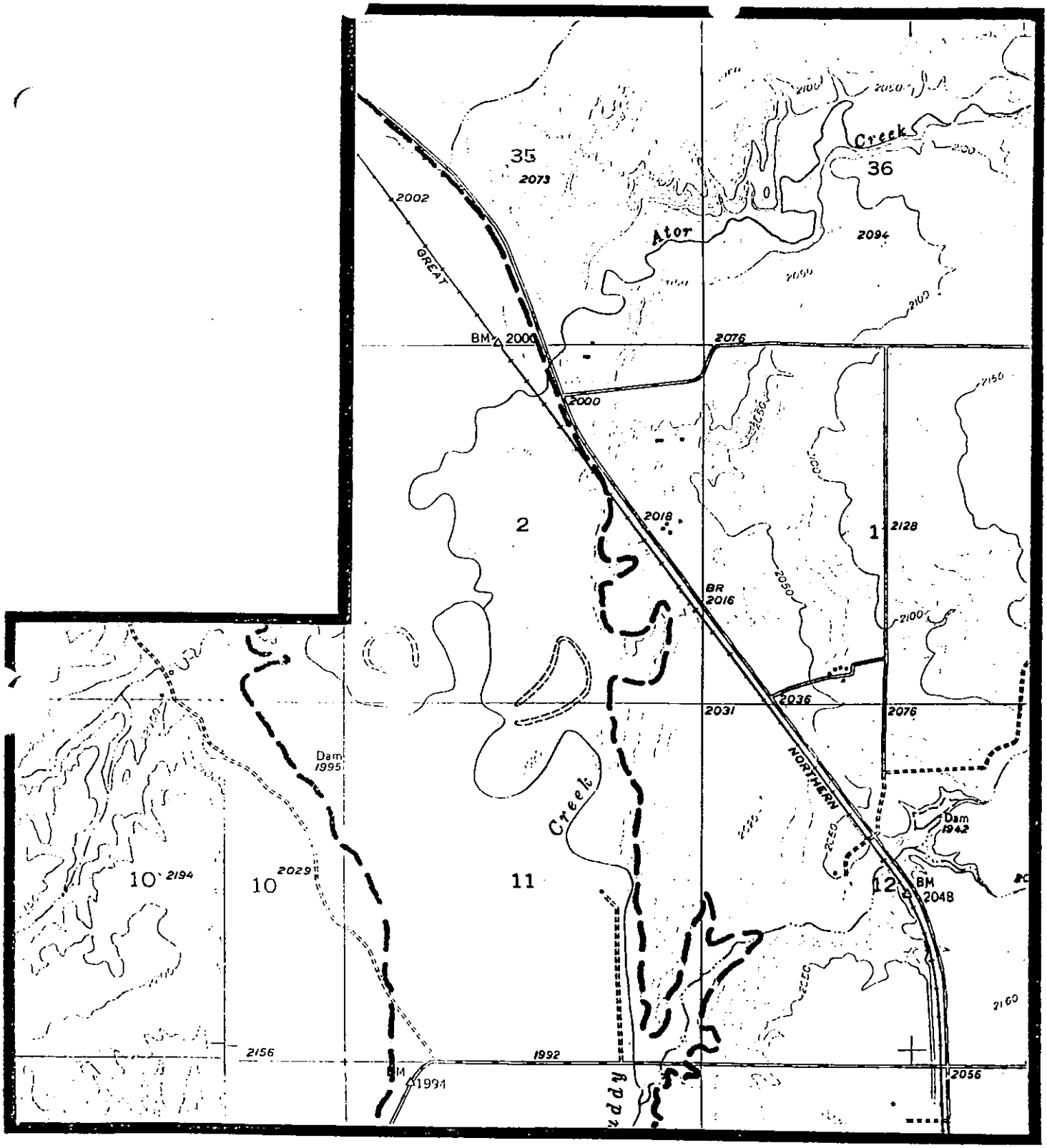
MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 2

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 3



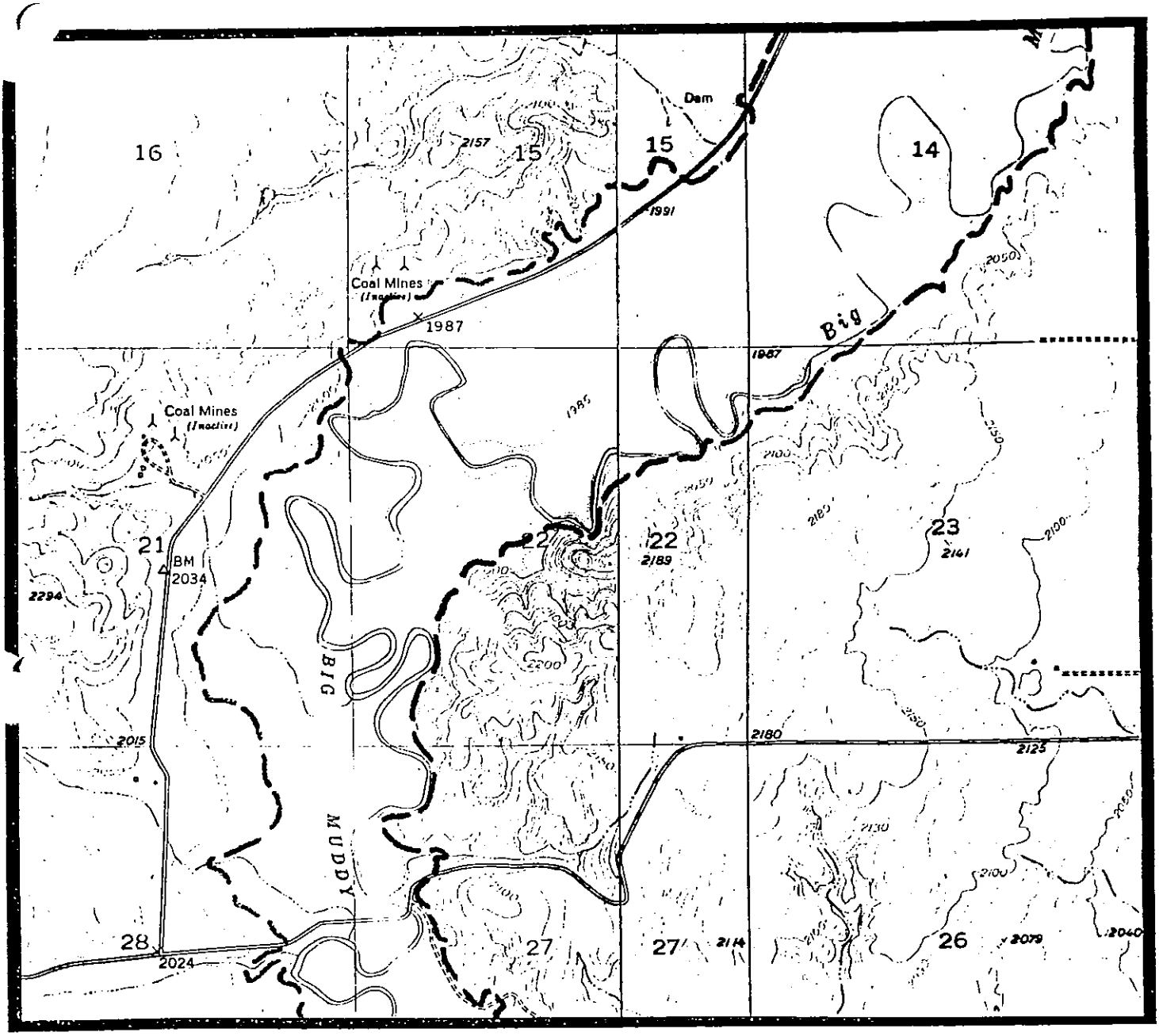
MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 3

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 4



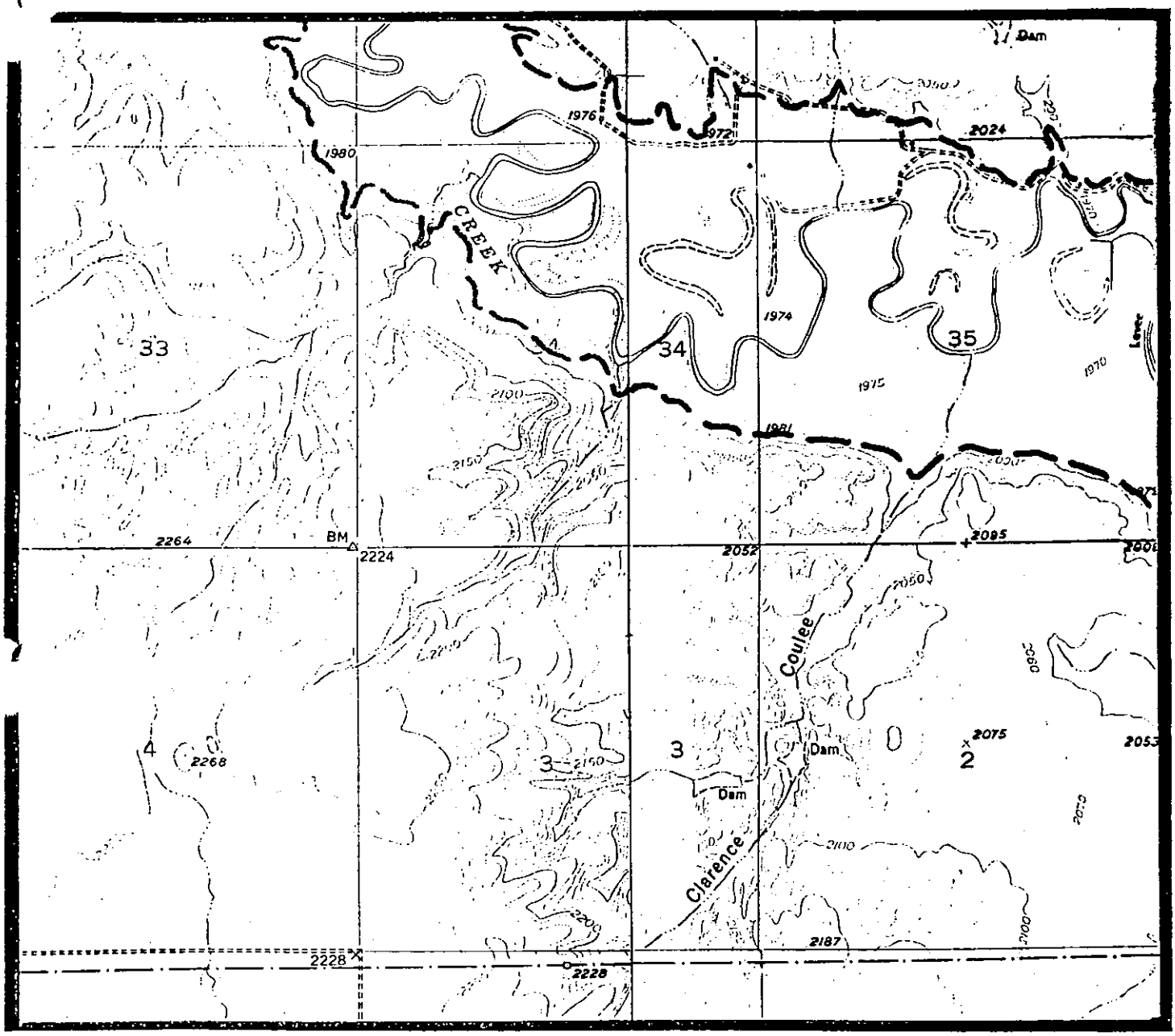
MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 4

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 5



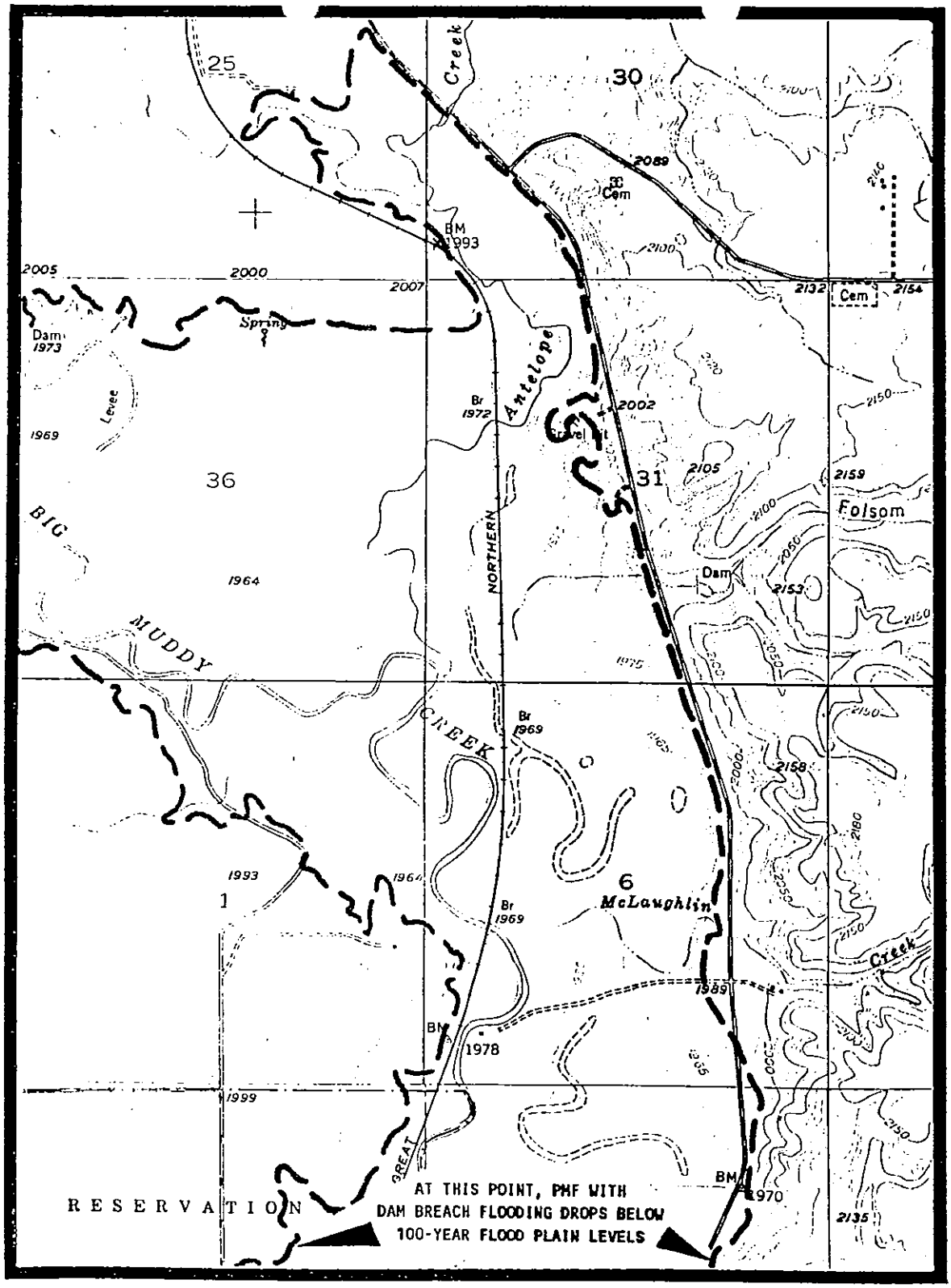
MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 5

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 6



MONTANA DAM FAILURE FLOOD MAPPING
BOX ELDER CREEK DAM (MT-934)
REACH 6

SCALE 1:24,000

0 .5 1
miles

FLOOD BOUNDARIES
CLEAR WEATHER BREACH ————
PMF WITH BREACH — — —

FIGURE 7

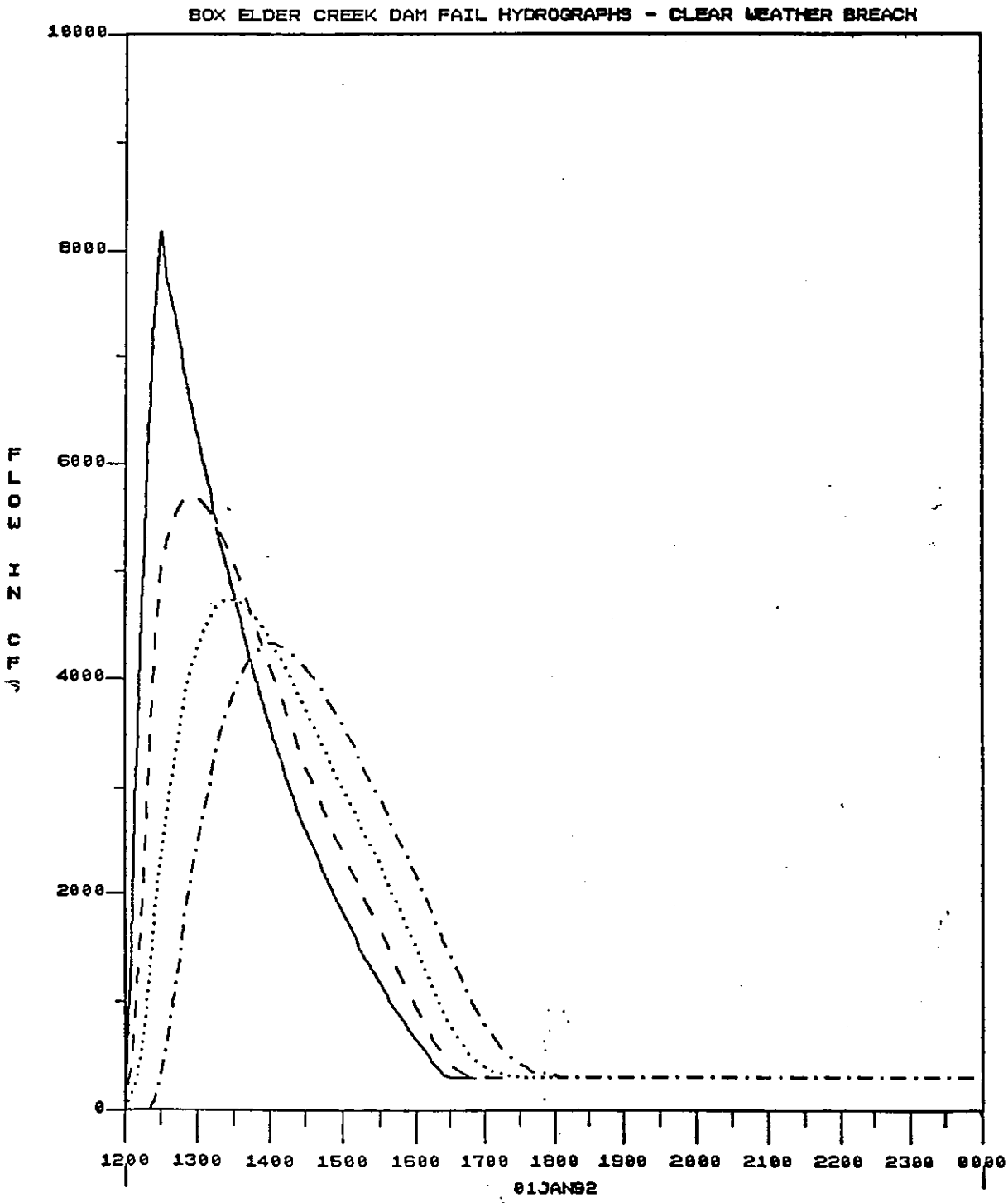

BOX ELDER CREEK DAM FAIL HYDROGRAPHS - CLEAR WEATHER BREACH
10000
8000
6000
4000
2000
0
FLOW IN CFS
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
0000
01JAN92
BOX ELDER CREEK DAM
0.5 MILES DOWNSTREAM OF DAM
0.7 MILES DOWNSTREAM OF DAM
1.3 MILES DOWNSTREAM OF DAM

FIGURE 8

02JAN92 11:48:07

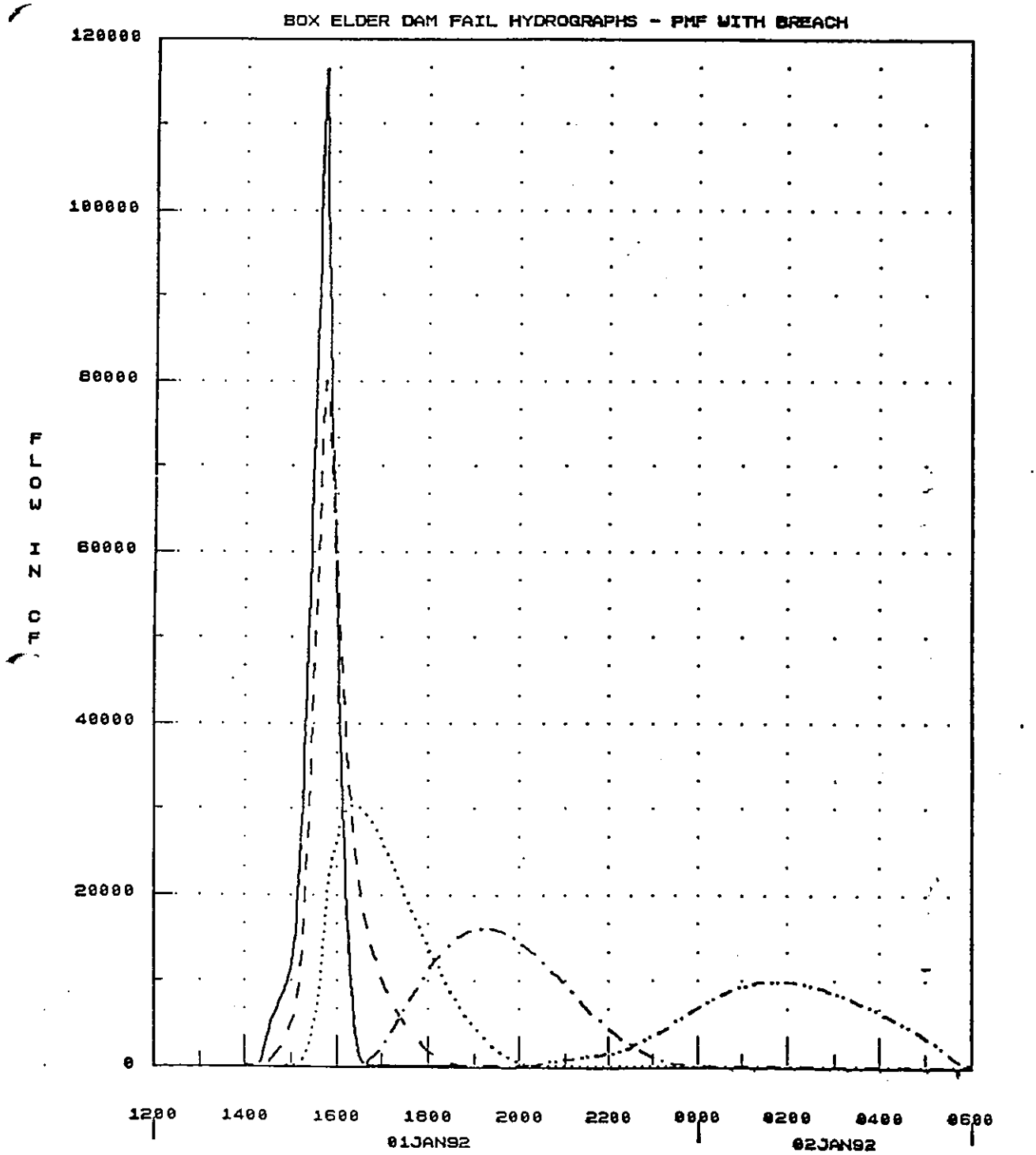


FIGURE 9

APPENDIX C
TELEPHONE DIRECTORY

A. Priority One

1. SHERIFF Sheridan County .....765-1200 or 911

2. DAM OPERATOR
Mr. Alvin Hollatz.....Office: 765-1700
..... Home: 765-2087

3. DISASTER AND EMERGENCY SERVICES Sheridan County
Mr. Curtis Petrik.....Office: 765-2970
.....Home: 765-2658

State Disaster and Emergency Services (Helena)
..... 841-3911

4. EVACUEES (in upstream-to-downstream sequence)

1. PLENTYWOOD HIGH SCHOOL
2. SHERIDAN COUNTY COURT HOUSE
3. GLENWOOD ACTIVITIES CENTER
4. CATHOLIC CHURCH - BASEMENT
5. MONTANA NATIONAL – BASEMENT
6. ELKS LODGE – BASEMENT
7. CONGREGATIONAL CHURCH
8. HIGH PLAINS BUILDING
9. RESIDENTS (OLD TOWN SITE)
10. RESIDENTS ADAMS ST. EAST

B. Priority Two

1. LOCAL ENGINEERS
Interstate Engineering Inc.
Briane Milne
Office: 433-5617
Home:.....488-6454
Cell 489-0067

2. MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION

Dam Safety Program Engineers: ..... Office: 444-~~6664~~ 6613 or 6613

Michele Lemieux, (Soils and Embankments) .....Home: 225-9062

Marvin Cross, Office 265-5516, Cell 262-3127, Home 265-9095

~~Terry Voeller (Spillways and Hydrology) ..... Home: 442-9638~~

Water Operations Bureau ..... Office: 444-6816

cell: 431-9475

Mr. Laurence Siroky, Bureau Chief ..... Home: 442-2806

3. NATIONAL WEATHER SERVICE

Glasgow ..... 228-9622 or 228-2850

Billings 652-2314

4. CITY OF PLENTYWOOD

Mr. Terry Gilbertson, Mayor 765-1700

APPENDIX D

DAM INCIDENT REPORT FORM

DATE: TIME:

NAME OF DAM:

STREAM NAME:

LOCATION:

COUNTY:

OBSERVER:

OBSERVER TELEPHONE:

NATURE OF PROBLEM:

LOCATION OF PROBLEM AREA (Looking Downstream):

EXTENT OF PROBLEM AREA:

FLOW QUANTITY AND COLOR:

WATER LEVEL IN RESERVOIR:

IS SITUATION WORSENING?

EMERGENCY STATUS:

CURRENT WEATHER CONDITIONS:

ADDITIONAL COMMENTS

APPENDIX E

Emergency Action Plan Distribution List

PLAN HOLDER	NUMBER OF COPIES
Dam Owner, City of Plentywood	2
Sheridan County Sheriff	1
Local DES Coordinator	1
DNRC Dam Safety Program	1